

## 1.3 Surface Areas of Objects Made from Right Rectangular Prisms son 3

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## SOLUTIONS

4. a) The composite object has 3 cubes.  
Each cube has 6 faces, so the total number of faces is:  $3 \times 6 = 18$ .  
The cubes overlap in 2 places, so there are  $2 \times 2$ , or 4 faces that are not part of the surface area.  
The surface area of the object, in square units, is:  $18 - 4 = 14$
- b) The composite object has 4 cubes.  
The total number of faces is  $4 \times 6 = 24$ .  
The cubes overlap in 3 places, so there are  $3 \times 2$ , or 6 faces that are not part of the surface area.  
The surface area of the object, in square units, is:  $24 - 6 = 18$
- c) The composite object has 5 cubes.  
The total number of faces is  $5 \times 6 = 30$ .  
The cubes overlap in 4 places, so there are  $2 \times 4$ , or 8 faces that are not part of the surface area.  
The surface area of the object, in square units, is:  $30 - 8 = 22$
- d) The composite object has 5 cubes.  
The total number of faces is  $5 \times 6 = 30$ .  
The cubes overlap in 5 places, so there are  $2 \times 5$ , or 10 faces that are not part of the surface area.  
The surface area of the object, in square units, is:  $30 - 10 = 20$
- e) The composite object has 5 cubes.  
The total number of faces is  $5 \times 6 = 30$ .  
The cubes overlap in 4 places, so there are  $2 \times 4$ , or 8 faces that are not part of the surface area.  
The surface area of the object, in square units, is:  $30 - 8 = 22$
- f) The composite object has 6 cubes.  
The total number of faces is  $6 \times 6 = 36$ .  
The cubes overlap in 5 places, so there are  $2 \times 5$ , or 10 faces that are not part of the surface area.  
The surface area of the object, in square units, is:  $36 - 10 = 26$
7. Explanations may vary.  
For example: There are views for which some of the faces are hidden. So, I cannot use 6 views to determine the surface area of this object.

8. Subtract the area of the overlapping faces when calculating the total surface area of the composite object.

b) Surface area of top rectangular prism:

$$\text{Area of top and bottom faces: } 2(2 \times 2) = 8$$

$$\text{Area of front, back, left, and right faces: } 4(2 \times 1) = 8$$

Surface area of middle rectangular prism:

$$\text{Area of top and bottom faces: } 2(4 \times 3) = 24$$

$$\text{Area of front and back faces: } 2(4 \times 2) = 16$$

$$\text{Area of left and right faces: } 2(3 \times 2) = 12$$

Surface area of bottom rectangular prism:

$$\text{Area of top and bottom faces: } 2(6 \times 4) = 48$$

$$\text{Area of front and back faces: } 2(6 \times 3) = 36$$

$$\text{Area of left and right faces: } 2(3 \times 4) = 24$$

In square centimetres, total surface area – overlap =

$$8 + 8 + 24 + 16 + 12 + 48 + 36 + 24 - 2(4 \times 3) - 2(2 \times 2) = 144$$

c) Surface area of the left rectangular prism:

$$\text{Area of top and bottom faces: } 2(2.5 \times 4.5) = 22.5$$

$$\text{Area of front and back faces: } 2(5.5 \times 2.5) = 27.5$$

$$\text{Area of left and right faces: } 2(5.5 \times 4.5) = 49.5$$

Surface area of the middle rectangular prism:

$$\text{Area of top and bottom faces: } 2(3.5 \times 3.5) = 24.5$$

$$\text{Area of front, back, left, and right faces: } 4(1.5 \times 3.5) = 21$$

Surface area of the right rectangular prism:

$$\text{Area of top and bottom faces: } 2(2.5 \times 5.5) = 27.5$$

$$\text{Area of front and back faces: } 2(2.5 \times 6.5) = 32.5$$

$$\text{Area of left and right faces: } 2(5.5 \times 6.5) = 71.5$$

In square centimetres, total surface area – overlap =

$$22.5 + 27.5 + 49.5 + 24.5 + 21 + 27.5 + 32.5 + 71.5 - 4(3.5 \times 1.5) = 255.5$$